



Technical Assistance in Implementing DG and CHP Projects at Federal Facilities

William Golove

Lawrence Berkeley National Laboratory

FEMP Distributed Generation and Combined
Heat and Power for Federal Facilities Workshop

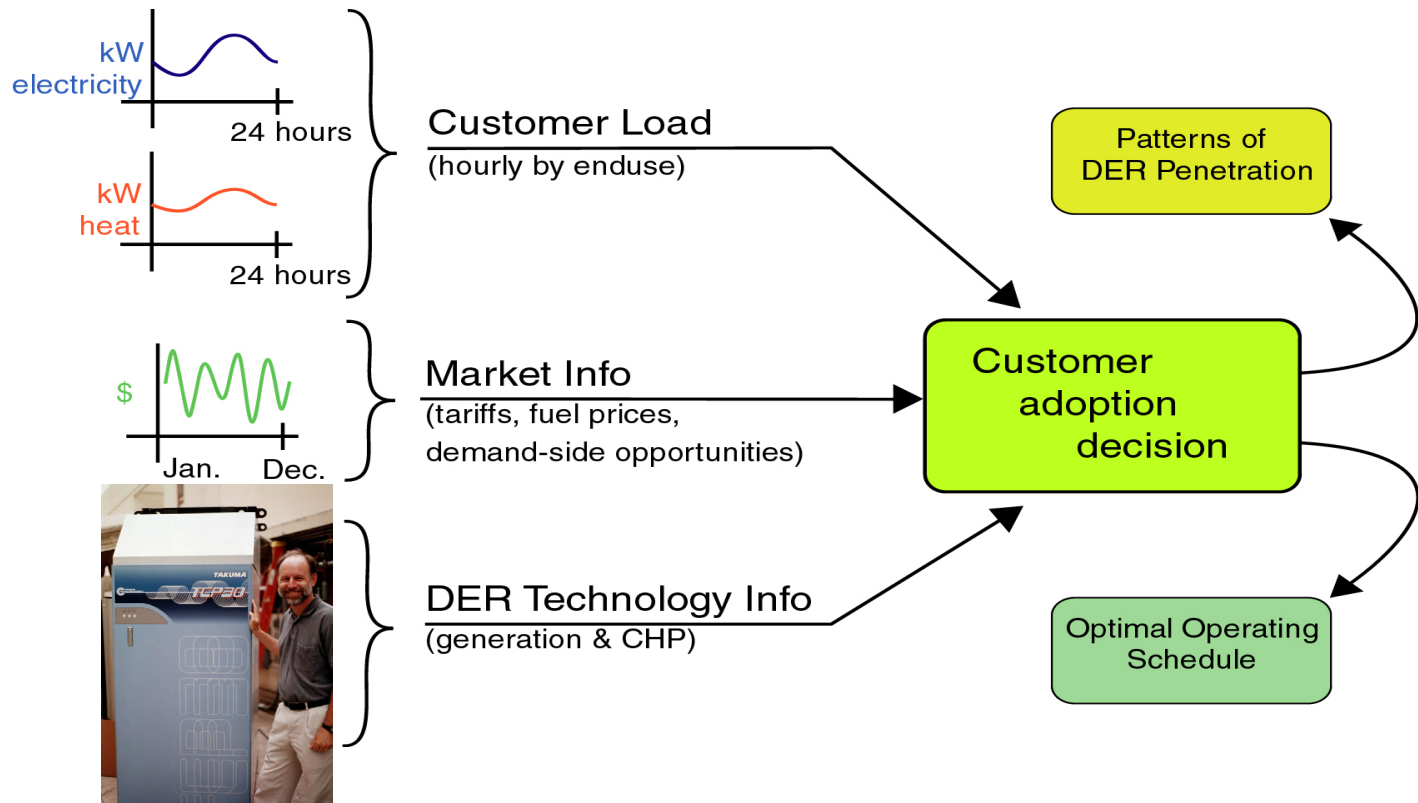
May 13 – 15, 2003

Overview of Projects

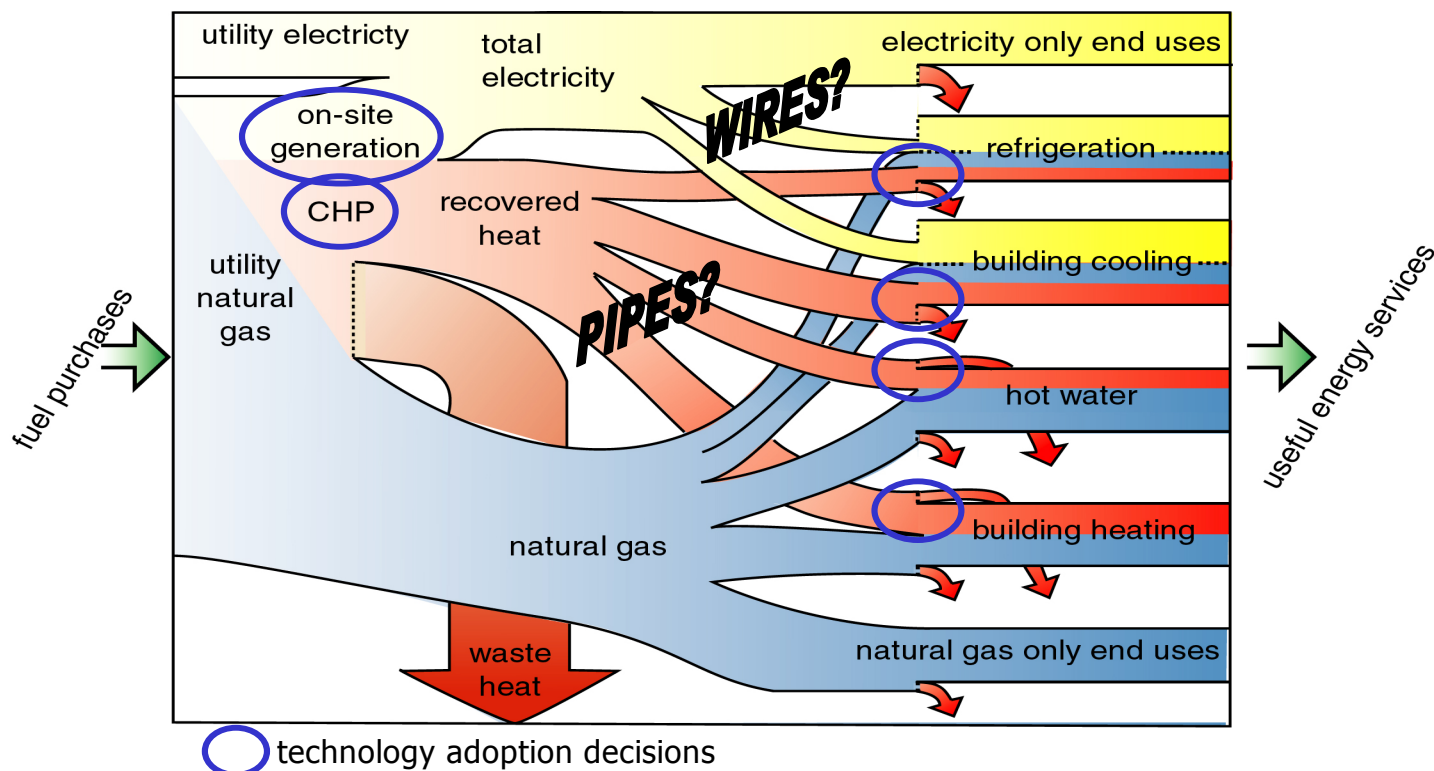


- USPS San Bernadino Processing & Distribution Center (P&DC) -- CHP
- FE Warren Air Force Base -- Vertical Axis Wind Turbines
- USPS Marina P&DC – Integrated PV/Solar Load Controller
- USPS Santa Clarita P&DC -- Landfill Gas to Electricity (CHP?)

DER Customer Adoption Model (DER-CAM)



Energy Flows Incorporating CHP



Case Study Results 1

(site selected DER installations vs. DER-CAM results)

site	DER chosen	DER-CAM result
1 A&P Super-market	60 kW microturbine with CHP	no DER installation / 60 kW microturbine with CHP
2 Guarantee Savings Building	600 kW fuel cells (3 x 200 kW) with CHP and absorption chiller	765 kW PV (1 x 100 kW), natural gas recips. (3 x 55 kW) with CHP, and natural gas recip. (1 x 500 kW) with absorption chiller
3 The Orchid	800 kW propane recips. (4 x 200 kW) with CHP and absorption chiller	900 kW propane recips. (2 x 200 kW) with CHP, (1 x 500 kW) with absorption chiller

Case Study Results 2

(site selected DER installations vs. DER-CAM results)

site	DER chosen	DER-CAM result
4 BD Biosciences Pharmingen	300 kW natural gas recip. (2 x 150 kW) with CHP	500 kW natural gas recip. (1 x 500 kW) with CHP
5 USPS San Bernardino	500 kW natural gas recip. (1 x 500 kW) no CHP, absorption chiller (?)	1120 kW natural gas recip. (2 x 500) kW with absorption chiller, and microturbines (2 x 60 kW) with absorption chiller

USPS San Bernadino P&DC – CHP Project - Background



- Initial project motivation: reliability in face of California electricity crisis (1 black-out, up to 30 more predicted)
- LBNL technical assistance provided through FEMP TA call and agency co-funding
- Early site estimate of outage costs: \$1M per episode (subsequently revised substantially downward; may be near \$0 for short-term event)
- Facility size: ~1.5MW peak, 500K sf
- Annual electric bill: ~\$1.3M
- Throughput: >1M pieces of mail per day

USPS San Bernadino P&DC – CHP Project – Feasibility Analysis

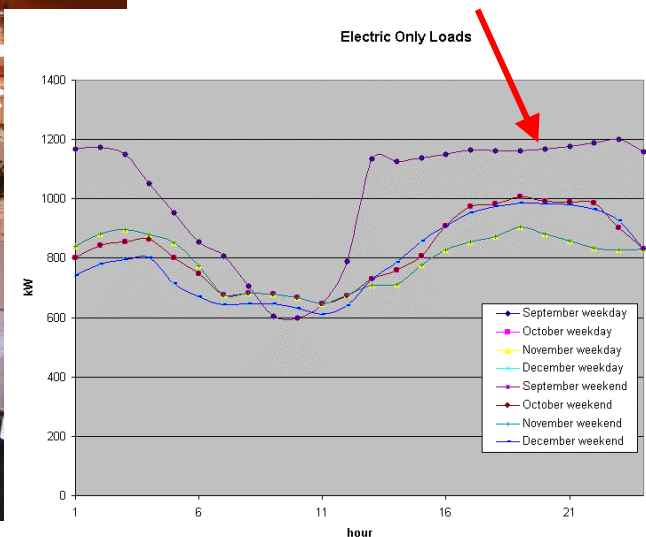


- Determine accurate cost of outages
- Establish minimum MW operating requirements
- Determine availability of heat load (required for CPUC rebate)
- Design CHP system (generation + heat recovery/use)
- Evaluate costs and benefits, especially in the face of key uncertainties
 - Gas costs
 - “Exit fees”
 - Standby Charges
- Status – feasibility study under review

San Bernardino USPS Redlands, CA (mail handling facility)



equipment runs mostly
in evening and night



large cooling load due to handling equipment

FE Warren Air Force Base -- Vertical Axis Wind Turbines



- Project: Install and compare 125 kW VAWT and 108 kW HAWT
 - Submitted through FEMP DER Call (equipment)
 - LBNL technical assistance provided through FEMP ad hoc project funding
 - ▼ Persuade DOE of project value
 - ▼ Assist w/ post-project evaluation
- Main motivations
 - Reliability/on-site generation/EO13123
 - Low turbine height/radar issues
 - Significant potential for replication
- Main barriers
 - VAWT is “unpopular” technology
 - Little performance data available for VAWT

USPS Marina P&DC -- Photovoltaic/Solar Load Controller - Background



- Initially 2 separate projects
 - Installation of 127kW (PowerLight PowerGuard) photovoltaic system
 - Installation of (Viron UtilityVision) web-enabled demand response/energy information systems (24 sites)
- Facility size: 1.2MW, 400K sf
- Motivation: EO13123, CA energy crisis, test technologies for agency use
- LBNL technical assistance provided through agency “work for others” Inter-Agency Agreement

USPS Marina P&DC -- Photovoltaic/Solar Load Controller – Project Description



- Project Concept
 - PV output subject to intermittent reductions in output which limit both economic value and peak reduction benefits
 - HVAC operations can be linked to PV output without impacting comfort to main demand reductions
- Coincidentally, PowerLight and Viron were developing a solar load controller using the two systems the USPS was installing

USPS Marina P&DC -- Photovoltaic/Solar Load Controller – System Performance



- Demand response – still in testing and training phase
- Photovoltaic
 - Technical – output consistently exceeding expectations
 - Financial – unexpected benefit of rate change
- Solar load controller – installation recently completed; operations testing expected shortly

USPS Marina P&DC -- Photovoltaic/Solar Load Controller - Funding



- California Energy Commission - \$1.2M award for demand response systems
- LADWP - \$690K for PV system
- FEMP DER Call - \$125K for PV system
- USPS – Balance of project costs (\$225K) and technical assistance (\$50K)





USPS Santa Clarita P&DC -- Landfill Gas to Electricity



- Santa Clarita P&DC located adjacent to large landfill currently flaring 7 – 12 MW of gas
- Facility size: ~2MW peak demand, 700K sf
- In negotiations for nearly 2 years before vendor revealed non-ownership of gas rights
- Consideration of direct gas use, but facility has history of trouble with absorption chillers
- Barriers
 - “Exit fees”
 - Standby charges
 - Facility concerns about location of generation plant
- Currently, in negotiations with new vendor
- LBNL TA co-funded through FEMP and agency

Conclusions



- DER technologies may have significant benefits for federal agencies
- But barriers (economic, regulatory, agency, technical, etc) may also be significant
- Many co-funding opportunities exist – be creative
- National laboratories can play key role in developing successful projects